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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/938,412	08/23/2001	Wan-Thai Hsu	UOM 0211 PUSP	9985

22045 7590 09/17/2003

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EXAMINER	
KWOK, HELEN C	

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 09/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/938,412	HSU ET AL.	
	Examiner	Art Unit	
	Helen C. Kwok	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 11, 2003 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 2, 4, 6-10, 15, 21 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 2, 4, 6-10, 15, 21 and 24, the phrase "the resonator" throughout these claims lacks antecedent basis. It appears that the phrase should be changed to -- the resonant element --.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-2, 4, 6-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Publication titled "Geometric Stress Compensation for Enhanced Thermal Stability in Micromechanical Resonators" (Hsu et al.) in view of either Publication titled "VHF Free-Free Beam High-Q Micromechanical Resonators" (Wang et al.) or U.S. Patent 6,249,073 (Nguyen et al.).

With regards to claims 1-2, 4, 6-18, Hsu et al. discloses a micromechanical resonator comprising a semiconductor substrate, a resonator element (the middle portion of the device, usually referred as the shuttle mass) made of polysilicon includes first and second ends; a temperature-compensating support structure (the inner and outer pair of folded beams with a truss support beam connecting the inner and outer pair of folded beams) is anchored by anchor lip to the substrate to support the resonant element at the first and second ends above the substrate wherein the support structure includes a first support member (the inner pair of folded beams) and a second support member (the outer pair of folded beams and the truss support beam) for coupling the first support member to the resonant element such that the first support member and the resonant element have different effective lengths (See page 946, paragraph starting with "As shown, this device ..."); a drive electrode structure and a sense electrode structure made of

plated metal are formed on the substrate . (As observed in Figures 2-4; pages 945-948, section I to IV). The only difference between the prior art and the claimed invention is the resonant element vibrates in a flexural mode. The references, Wang et al. and Nguyen et al., disclose a resonant element that is vibrated at a flexural-mode. (See, pages 453 of Wang et al.; column 5, lines 8-56 of Nguyen et al.). It would have been obvious to a person of ordinary skills in the art at the time of invention to have readily recognize the advantages and desirability of employing the resonant element (clamped-clamped beam or free-free beam) to vibrate at a flexural-mode as suggested by either Wang et al. or Nguyen et al. to the apparatus of Hsu et al. to provide better high Q values at VHF frequencies by altering their supports so that anchors and associated losses are virtually eliminated from the design. (See, pages 453-457 of Wang et al.; column 5, line 8 to column 7, line 57). Furthermore, to have set the resonant element to vibrate in a flexural mode or in a translational mode or any other type of mode is a mere experimental design choice that is well known to an artisan in the art when determining what mode would provide the best results and achieve the expected goal.

With regards to claim 19, it would have been obvious to an artisan to use the device as a temperature sensor since this is a mere design expedient to the manufacturer and since, as disclosed on page 948 of Hsu et al., the device can be used in watches or wireless transceivers, meaning that the device can be used in other preferred embodiments without departing from the scope of the invention.

With regards to claims 20-23, the claims are commensurate in scope with the above claims and are rejected for the same reasons as set forth above. Furthermore, the frequency versus temperature curve have peaks and valley and increases in dependance of the resonant element. (See, Figures 1 and 9).

With regards to claim 24, it would have been obvious to a person of ordinary skill in the art to have readily recognize the advantages and desirability of fabricating the first and second support members of the support structure wider than the resonant element to prevent the support structure from vibrating during operation since one would normally realize in order to prevent the support structure from vibratory movement, one needs to make these support members more rigid and stronger by making its dimensions larger in width or length or by adding mass/weight to the support structure than the resonator so that when the resonator vibrates and/or bends at a certain direction (the x-direction or the y-direction), the support structure is not affected and will not vibrate and/or bend at that particular direction due to its larger dimensions and weight.

With regards to claims 25 and 26, Wang et. and Nguyen et al. further disclose that the support members do not vibrate during resonant vibration of the resonant element. (See, as detailed in Wang et al.; column 7, lines 38-43 of Nguyen et al.).

6. Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Publication titled "Geometric Stress Compensation for Enhanced Thermal Stability in Micromechanical Resonators" (Hsu et al.) as applied to claim 1 above, and further in view of

Publication titled "Micromachining Technologies for Miniaturized Communication Devices (Nguyen).

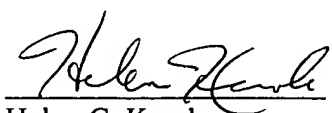
With regards to claims 3 and 5, Hsu et al. does not explicitly suggest a submicron lateral capacitive gap between the resonant element and the electrodes. Nguyen discloses a resonant element beam, as observed in Figure 9, a submicron gap between the resonant element and the electrodes. It would have been obvious to a person of ordinary skill in the art at the time of invention to have readily recognize the advantages and desirability to implement the device of Hsu et al. to provide a submicron gap between the resonant element and the electrodes as taught by Nguyen to reduce electrode series resistance. (See, page 29, last paragraph of Nguyen).

Response to Amendment

7. Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen Kwok whose telephone number is (703) 308-8149.



Helen C. Kwok
Art Unit 2856

September 15, 2003